RMA

The Resource Modeling Association is an international association of scientists working at the intersection of mathematical modeling, environmental sciences, and natural resource management. We formulate and analyze models to understand and inform the management of renewable and exhaustible resources.

RMA Newsletter Spring 2022

Hybrid: in Leipzig, Germany & Online streaming

Important dates:
Registration dealine:
May 15, 2022
Conference:
June 14 - 17, 2022

Venue:
German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig

more info at:
www. idiv.de/wcnrm2022

Keynote speakers:

Ingird van de Leemput
Wageningen University & Research, The Netherlands.

Martin Herold
GFZ German Research Center for Geoscience, Germany,

Simon Dellicour
Université Libre de Bruxelles, Belgium

Organizers:
Frank van Langevelde, Fadia Al-Abbar, Martin Quaas

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PRESIDENT'S COLUMN

by Frank VAN LANGEVELDE

As if nothing happened the last 2 years.... Many societies are back to normal – no lockdowns, no working from home, teaching in person – due to great scientific achievements of last year such as the development of different vaccines and improved medications for treating Covid infections. Next to these achievements, we gained better understanding to prevent such pandemics, especially the early detection of pathogen spill-over from wildlife to people and livestock. In these times, I hope that you and your family are all doing fine. However, we may easily forget that the origin of Covid-19 is most likely the close contact between people and bats in which many corona viruses are found. Such pandemics may reoccur without careful consideration of how societies protect wildlife as close contacts between people and wildlife frequently occur forests are logged and livestock is kept close to wildlife. We should learn from the recent pandemic and not going back to normal, but rethink protection of nature and sustainable harvesting strategies.

From June 14 - 17, the next World Conference on Natural Resource Modeling will be organized in Leipzig. I hope to meet all of you in person again after 2 years. For the ones that cannot attend the conference in person, we will organize online connections. The theme of the conference will be "Modelling natural resource management in a changing world". The aim of the conference is to discuss how ecological-economic system dynamics respond to changes in the environment and society and develop towards long-term sustainability. Three keynote speakers will give their view on the theme. We are honoured to have three well-known scientists: Ingrid van de Leemput (Wageningen University & Research, The Netherlands), who works on theory of tipping points applied in many different systems (including resilience in health care), Martin Herold (GFZ German Research Centre for Geosciences, Germany), working on remote sensing and modelling changes in land use, and Simon Dellicour (Université Libre de Bruxelles, Belgium), who is an expert on species distribution modelling. These keynote speakers will set the stage for our thinking about modelling natural resources that are heavily exploited. Many abstracts have been submitted so that we can present an interesting programme. I hope we can visit this beautiful old German city and experience the history and culture of Leipzig during the conference.

Let's use communication of the RMA through social media such as ResearchGate, LinkedIn and Twitter, which are open for your input. We can use these media to circulate information in line with the objective of the RMA, such as new academic positions, conferences, workshops, books, papers. It would be great if these media can also be used for topics related to the focus of the RMA to be discussed among the members and others.

The objective of the RMA is to foster research and teaching at the interface of ecology, economics, mathematics and computer sciences and devote to the sustainable management of natural resources and ecosystems. As members of the RMA we have the possibility to promote the global interest in sustainability and environmental issues. I am convinced that the RMA can help society in these unprecedented times. I hope that the upcoming conference in Leipzig, the journal Natural Resource Modeling, the RMA newsletter and social media will help us with this.

I want to send my very best wishes to everyone in the RMA community!

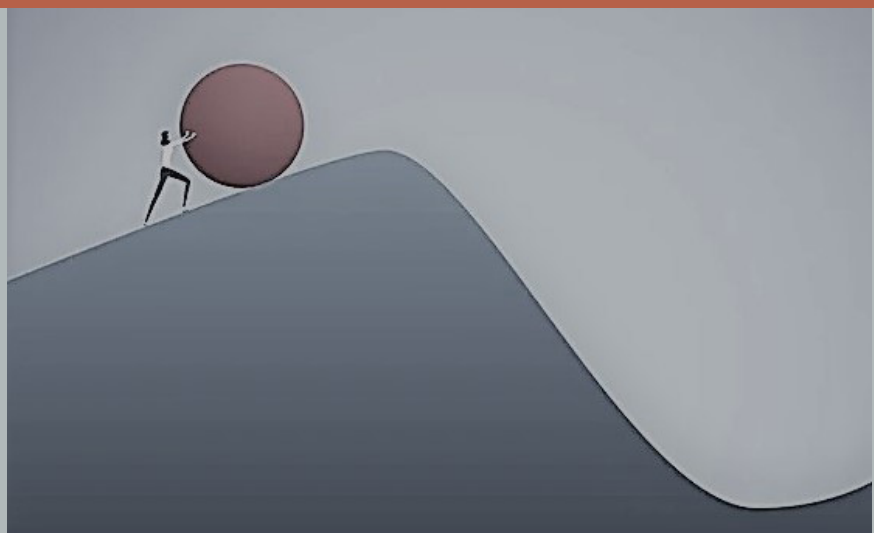
Frank van Langevelde
President RMA,
Professor Wildlife Ecology and Conservation
Wageningen University The Netherlands

To tip or not to tip

Reflections on tipping points in ecological-economic systems

by Marie - Catherine Riekhof

Chair of Political Economy of Resource Management ,CAU, Kiel (Germany).



Tipping points are all over. They may relate to " that magic moment when an idea, trend, or social behavior crosses a threshold, tips, and spreads like wildfire …" ("The Tipping Point: How Little Things Can Make a Big Difference" by Malcolm Gladwell (2000, back cover). Then there is "Neighborhood tipping", relating to the study of segregation as results of many individual choices, which has been described by Thomas C. Schelling (1971, p. 145). According to the International Panel for Climate Change, "Tipping points refer to critical thresholds in a system that, when exceeded, can lead to a significant change in the state of the system, often with an understanding that the change is irreversible" (Hoegh-Guldberg et al., 2018, p. 262). The examples show that tipping points are discussed in the socio-economic, but also in the ecological realm.

The focus here is on tipping points in interrelated social-ecological systems (SESs). Such systems consist of different sub-systems, usually at least an ecological and a social one. Tipping points present in one sub-system may have cascading effects on other sub-systems, or may co-occur in multiple sub-systems. The review by Lauerburg et al. (2020) on empirical marine case studies (n=38) found that the majority of case studies (60%) located the tipping point solely in the ecological sub-system and that 47% of the studies report cascading effects to other sub-systems. This is interesting, as Milkoreit et al. (2018) define multiple stable states, abruptness, feedbacks, and limited reversibility as necessary conditions of tipping points in ecological-economic systems based on an interdisciplinary literature review. It seems that feedbacks (e.g. in the form of cascading effects) do not always materialize between sub-systems.

The questions of whether feedbacks to other sub-systems occur when one sub-system crosses a tipping point raises interesting questions related to (limited) reversibility, agency and, when discussing agency, also to the question of the desirability of different states. In the following, I will reflect on these issues and argue that all depend on the system's boundary. It seems that overall, the question of a system's boundary deserves special attention when discussing tipping points.
To reflect on limited reversibility, I will look at two examples.

One system with multiple states is the Northern Humboldt Current Upwelling in front of Peru. Anchovy alternate with sardine, with the change in the ecological sub-system, driven by oceanic conditions (Salvatteci et al., 2019). Feedbacks occur in the sense that the ecological state (Anchovy vs Sardine) impacts the economic sub-system, as the yield of Sardine catches is much lower than of Anchovy. Whether there is limited reversibility between the states depends on the time period considered. Looking at the 1960-1980 period, it seems like the system has tipped, while a longer period 1960-2010 suggests reversibility (see the Figure 1). This highlights the importance of the boundary of the system in terms of the period considered.

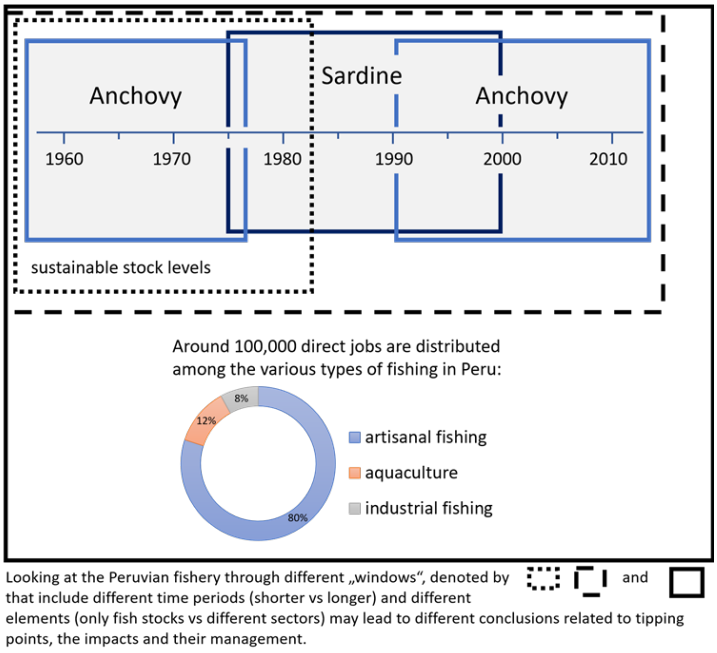


Figure 1:Peruvian fishery "windows".

Another example to consider the aspect of reversibility and the chosen time period is provided by the activities in the bay of Sechura in Peru. Since the 1997/1998 El niño, adventurous fishers turned Sechura into a national hot spot for scallop production, attracting more fishers migrating there from other regions (Kluger et al., 2019). The coastal El niño 2017 led to tipping points in the ecological and in the social sub-systems. In the ecological sub-system, it led to an altered composition of the fish community and a complete die-off of scallops in the bay of Sechura. In the socioeconomic sub-system, heavy rains made fishing nearly impossible and roads were destroyed such that markets could often not be reached. If they could be reached, relatively higher prices could be obtained. One year later, the fishery was back to normal (adapted to different fishing opportunities); while scallop production not (lack of seed supply). Whether the state of the system has reversed or tipped (back) during the considered time period depends on the sub-systems included in the analysis.

So far, the focus was on exogenous drivers towards tipping points with limited agency of humans involved. For example, Anchovy vs Sardine dominated periods were driven by climatic conditions exogenous to (local) human management. Climate change in general is often seen as an exogenous driver that leads to tipping points (Möllmann et al., 2021). Obviously, climate tipping has an impact on society, but if we look at climate change from a global perspective, this implication also holds in the opposite direction. Because society as a whole is an important factor driving climate change, climate change is not exogenous anymore. Thus, whether a driver is exogenous or endogenous also depends on the system's boundaries.

The introduction of fishery management may also relate to a tipping point, as a sub-system's dynamics are changed. It can be detected in the data as break points (Riekhof and Noack, 2022). Still, does the manager tip the system "exogenously"? "Although managers are foresighted and operate to shift the SES topology, their policy choices are feedback responses to ecological variables, making them part of the SES" (Horan et al., 2011, p. 7333). Again, the question of the system's boundaries arises and related, the question of agency.

Once we consider agency, the desirability of different states becomes relevant. Assuming a manager (or society) has the ability to tip the system, which state is desirable? For the case of the fishery of Chilika Lagoon (India), just introducing total allowable catch will lead to a healthy fish stock (Noack et al., 2018). With a perspective on the fish stock, this seems to be a preferable state. What would resource regulation look like, if the fishers were also considered? It turns out that (non-) tradable quota may be preferable as this may allow fishers, previously trapped in the fishery sector, to invest and subse -

quently earn more in the manufacturing sector. So, depending on the boundary of the system considered, whether only the ecological sub-system or also the social sub-system is considered, makes a difference (see the Figure 1 for an illustration). Including non-fishers in the analysis may further change the policy preferred.

What happens if different stakeholders are asked about their preferred states? A survey among stakeholder representatives at the Western Baltic Summit I (21.11.2019, Hamburg) as part of the marEEshift project revealed that ideas on the sustainable development of the Western Baltic Sea (WBS) differed quite substantially between different actors. It seems that different ideas are around, consequently the question arises, who decides on whether "To tip or not to tip", i.e., who has agency and who is actually included?

To conclude on "To tip or not to tip..." in the sense of whether the system is actually tipping (or only fluctuating) and whether one can actively tip the system and if so to where, I would like to focus on three points based on the examples given. First, tipping points often relate to a transition to a different state with limited reversibility, and reversibility depends a lot on the time period considered. Second, different (sub-)systems come with different agency, so boundaries for the system at hand matter. Third, "desired states" (also) depend on the system's boundaries i.e. on which aspects are included in the analysis. With these aspects in mind, a "Window of a tipping point" with the boundaries of the system marked (sub-systems, time period) may be a useful way forward to analyze tipping points.

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Catching-up with former RMA awardees: Charlotte Gerling

PhD Student at BTU Cottbus - Senftenberg (Germany)

In this column, dedicated to a former recipient of the Best Student Presentation, Charlotte Gerling, kindly accepted to answer few questions.

RMA: *You've been awarded during WCNRM 2018 held in Guangzhou, could you tell us a little bit more about you at that time and some memories about the conference ?*

Charlotte: The WCNRM in 2018 in Guangzhou in China was the first international conference I attended. I had finished my Master's degree at the BTU Cottbus in October 2016 and presented a paper based on the research I conducted in my Master thesis on the impact of organic farming on biodiversity. To be honest, I was a bit intimidated for this being the first international conference I attended. But I quickly started to enjoy the extremely friendly atmosphere and the exchange with others. Of course, having never been to China before, the field trip and getting to see the area was a nice treat as well !

RMA: *What happened since then ? What is your current position, and your research fields and interests ?*

Charlotte: Around the time of the conference I started working on a new topic as I got a position in a longer-term research project, which is also what I'm doing my PhD on: climate-ecological-economic modelling for the conservation of biodiversity under climate change. I focus on the design of policy instruments, which I find is an extremely important and fascinating topic.

RMA: *Are you a member of Resource Modeling Association and/or are you still in touch with present RMA members ? Had RMA somehow helped you in a particular way ?*

Charlotte: I kept in touch with John Hearne, who is an RMA board member. In the beginning of 2020 (just before the lockdowns started – I was very lucky!) I visited him in Melbourne and we have been working on a model with Oliver Schöttker, who is a colleague of mine and also a board member of the RMA. In the process, I learned a lot by being exposed to new ideas, ways of thinking, and methodologies – so the contacts I made through the RMA have definitely helped me! We actually just submitted our joint paper this week (april 2022).

RMA: *Have you attended other WCNRM and will you recommend it to young researchers ? Could you give some advice to young students to improve their presentations or posters ?*

Charlotte: I haven't been to any other WCNRM so far but I'm hoping to present at this year's WCNRM in Leipzig and would also recommend it to other young researchers. I think when holding a presentation, it's important to keep in mind who your audience is – accordingly, it may be better to focus on policy recommendations or the methodology, for example. For the presentation, I'd recommend focusing on the main message: why is your topic important? What's the logic behind your model? And what do your results mean? It's always tempting to explain all the complicated details of your model as you spent so much time working them out - but I think that's best left for detailed discussions over a beer afterwards. Finally, being excited about your topic yourself is probably the most important part to capture your audience !

RMA in the Social Media

For several years now, the Resource Modelling Association is taking an active role in communicating science, conference information, job and PhD openings, and many other natural resource modelling related news through their social media channels. By utilizing different social media platforms, such as Twitter, Facebook, Researchgate and LinkedIn, we want to create social and community engagement with issues and topics relevant for the RMA, its members and the general public. By doing so, authors and contributors of the RMA's journal Natural Resource Modelling are given an additional outlet, which advertises their research and allows them to reach a wider audience. Young researchers as well as senior scientist can regularly find information on new job openings, PhD scholarships and other job markets related information in the field of natural resource modelling and adjacent fields, ranging from mathematics, over natural and environmental sciences, to economics. We also distribute information on conferences and workshops in said scientific fields, and in particular cover the presentations and events on RMA's on annual World Conference of Natural Resource Modelling.

Since 2013, you can find all the latest news on our facebook.com page :

www.facebook.com/ResourceModelingAssociation.

To promote our contents more directly in the scientific community, in 2016 we launched a project on researchgate.com, where you can find new info under:

www.researchgate.net/project/Resource-Modeling-Association.

Also in 2016, we launched our discussion group Resource Modelling Association on LinkedIn.com.

Resource Modelling Association (RMA)

Expanding our social media activities even further, in 2017 we started our Twitter feed under the handle

@ResModelAsso.

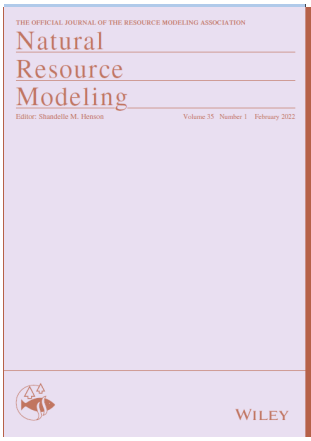
Since then, we were able to grow our audience and followership, and currently reach hundreds of researches and people the general public with our regular posts.

We, want to invite you all to join us and let us know about interesting news to post on our channels!

Charlotte Gerling

Hélène Gomes

Oliver Schöttker



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Volume 35, number 1 February 2022

All contents of Natural Resource Modeling volume 35, Issue 1 are open access. Papers published in NRM are immediately freely available to read, download and share.

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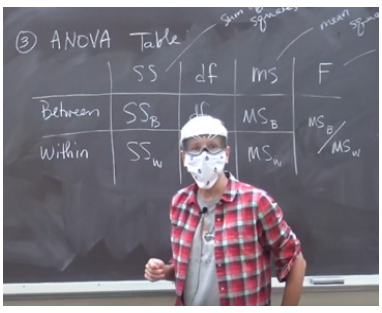
Editor-in-Chief Shandelle M. Henson looks forward to receiving your submissions to NRM. If you are interested in guest editing a special issue, please contact her:

henson@andrews.edu.



Two Announcements from the RMA board

New Membership terms

In the past, the membership of the Resource Modelling Association included a copy of or access to the journal Natural Resource Modelling. As the journal is now published online under open access, the benefits of the RMA membership disappeared. Therefore, we decided the eliminate RMA membership fees, making membership in the organization free to anyone interested in the RMA's work. Participants to the annual conferences WCNRM will automatically become members of the RMA. All current members will remain members until they ask to remove them from the membership rolls.

We are currently renewing the website of the RMA, which will include the option to become a member of the RMA or to unsubscribe as member.

Treasurer needed

The RMA seeks a member to serve as the society's treasurer. The RMA is legally incorporated in the United States so its treasury resides in a US bank. For this reason we seek a citizen or legal resident of the US to serve in this position. If you are interested in this important position and would like more information, please contact our current treasurer, Steven McKelvey, at:

mckelvey@stolaf.edu.

The official newsletter of the
Resource Modeling Association

Editors : Anne-Sophie Masure, Julie Vissaguet,
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